Two New Ants of Tribe Ectatommini from Colombia (Hymenoptera: Formicidae)

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(With 5 text-figures)

In early 1967, one of us (Brown), in company with Dr. Richard B. Root, made a number of collecting trips in the Sierra Occidental, just to the west of Cali, Departamento de Valle, in southwestern Colombia. Our host and guide, who knows the area very well, was Dr. Harold Trapido of the Rockefeller Institution. To him we are grateful for the opportunity to work in this area hitherto virtually unknown for ants. Among many interesting ant species taken on these excursions, two new ectatommines are of particular significance.

Heteroponera monticola n. sp. resembles in its large size and long, acute propodeal teeth and petiolar spine a species of the related genus *Acanthoponera*, but the critical characters of palpal segmentation and shape of tarsal claws are those of *Heteroponera*. Thus, the separation of these two genera does not come into serious question on the basis of present evidence, but our ideas of evolutionary radiation of *Heteroponera* must be expanded. *H. monticola* comes from a high, wet region near the upper limit of forest ant occurrence, where ants of whatever kind are scarce and very hard to find. Aside from 3 *H. monticola* nests, none of these containing as many as 50 adult workers, we found there only a species of «*Iridomyrmex*» of the *humilis* group, and a *Pheidole* that cannot yet be determined, and may be new.

Gnamptogenys perspicax n. sp., from a slightly lower altitude, is a fine large species that preys on millipeds and is otherwise a perfect intermediate in a forked morphocline of milliped-feeders beginning in the evolutionary vicinity of *G. mecotyle* and ending on the one hand in *G. bispinosa* of Costa Rica and on the other in *G. schmitti* («*Emeryella*») of Haiti. The evidence that all of these species are specialist predators of millipeds will be discussed in another paper.

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The discovery of the two new species described below is of more than routine interest. It not only rounds out and extends our knowledge of the important tribe Ectatommini in the Americas, but it adds to the evidence that the current hypothesis of tribal phylogeny may fairly represent the real course of its evolution.

Heteroponera monticola n. sp.

(Figs. 1, 2)

Worker (holotype). — Total length 7 mm; maximum length of head capsule 1.65 mm; maximum width of head in front of eyes 1.46 mm; maximum width between frontal carinae 0.73 mm; maximum diameter of eyes 0.29 mm; length of scape 1.24 mm; Weber's length of thorax 2.11 mm; hind femur length 1.65 mm; petiole length 0.59 mm; petiole width 0.59 mm; width of tergum I of gaster 1.43 mm; width of tergum II of gaster 1.32 mm. Piceous black, gaster lighter, more reddish-brown; mandibles, tips of scapes, femora and tibiae, the entire coxae and trochanters fuscous ferruginous; funiculi, tarsi and apical gastric segments lighter. Integument quite shiny throughout notwithstanding the sculpture. Normally exposed surfaces of body covered with an abundant and mostly decumbent, fine, light-colored pubescence, sparse only on the mandibles, gula and retractile segments of gaster. Body and appendages also with an abundant pilosity of fine, tapered erect hairs, uneven in length, the longest about 0.50 mm long.

Head as shown in Figs. 1 and 2. Mandibles triangular, smooth and shining, with sparse piligerous punctulae, baso-laterally inconspicuously rugulose-punctate; chewing border with approximately 8 small teeth, apical and subapical teeth stronger: basal angle rectangular; a shallow curved groove parallels the basal border. Clypeus convex in the middle, with a strong sagittal carina prolonged more faintly caudad over the dorsum of head, fading on occiput; anterior clypeal apron narrow, its border gently convex, its lateral corners bluntly rectangular. Frontal area smooth, distinctly impressed. Frontal carinae forming convex lobes in front, covering the antennal sockets from above, then running parallel caudad and fading out at level of middle of eyes. Antennal scrobes weakly defined, terminating indefinitely in front and above eyes. Eyes strongly convex, each with a circummarginal sulcus; facet count across greatest diameter about 14. Occipital corners lobate, projecting both in dorsal and lateral view, sharply

marginate infra-laterally. Antennal scapes finely reticulate-punctate, incrassate toward apices, which reach or even slightly surpass the occipital margin when laid straight back or nearly so from their insertions. Funiculi gradually thickened toward their apices; segments I and XI nearly twice as long as thick, the remaining segments slightly to distinctly longer than thick. Dorsum and sides of head reticulate-rugose and foveate; the foveae larger, with the intervening meshes of rugae less distinct on dorsum, smaller, and rugae more distinct, on sides. Gular face impressed; finely but indistinctly reticulate-punctate or rugulose. Microsculpture of head capsule consisting of fine more or less distinct punctulae. Palpal formula 3,3.

Truncus as shown in Fig. 2. Pronotum gently convex in both directions, shoulders completely rounded, antero-inferior corner rectangular. Promesonotal suture deeply cut, possibly mobile. Mesonotum continuous with dorsum of propodeum, straight in profile, transversely convex; metanotal suture absent. Propodeal teeth unusually long, obliquely raised and diverging caudad; their length greater than the distance between their inner faces at base. Propodeal stigma protruding, its opening facing caudad. Declivitous face of propodeum transversely costate between spines, smooth and shiny below, laterally immarginate. Microsculpture of truncus consisting of fine, indistinct punctulae and rugulae, which do not suppress very much the luster of the integument. Dorsum of thorax with shallow larger foveae (especially on pronotum) and more distinct rugulae. Coxae more heavily punctulate and subopaque; femora and tibiae more lightly sculptured and shining. Tarsal claws simple (without basal lobe and preapical tooth), needlelike.

Petiolar node as long as broad, its apex drawn out posteriorly in a long spine extending caudad and sloping slightly dorsad. Subpetiolar process in the form of a sagittal flange, the anterior corner of which is rectangular, the posterior subacute. Segment I of gaster (postpetiole) vaulted, hemispherical, slightly constricted just in front of posterior margin. Segment II narrower, with the stigma protruding from a small tumulus on each side of tergum. Sculpture of petiole and segments I and II of gaster the same as on thorax. Petiole with only anterior face finely punctulate; posterior face, beneath spine, practically smooth and shining. Tergum I with sparse, shallow foveae, the punctulae quite superficial except on posterior margin where rugulae become more distinct.

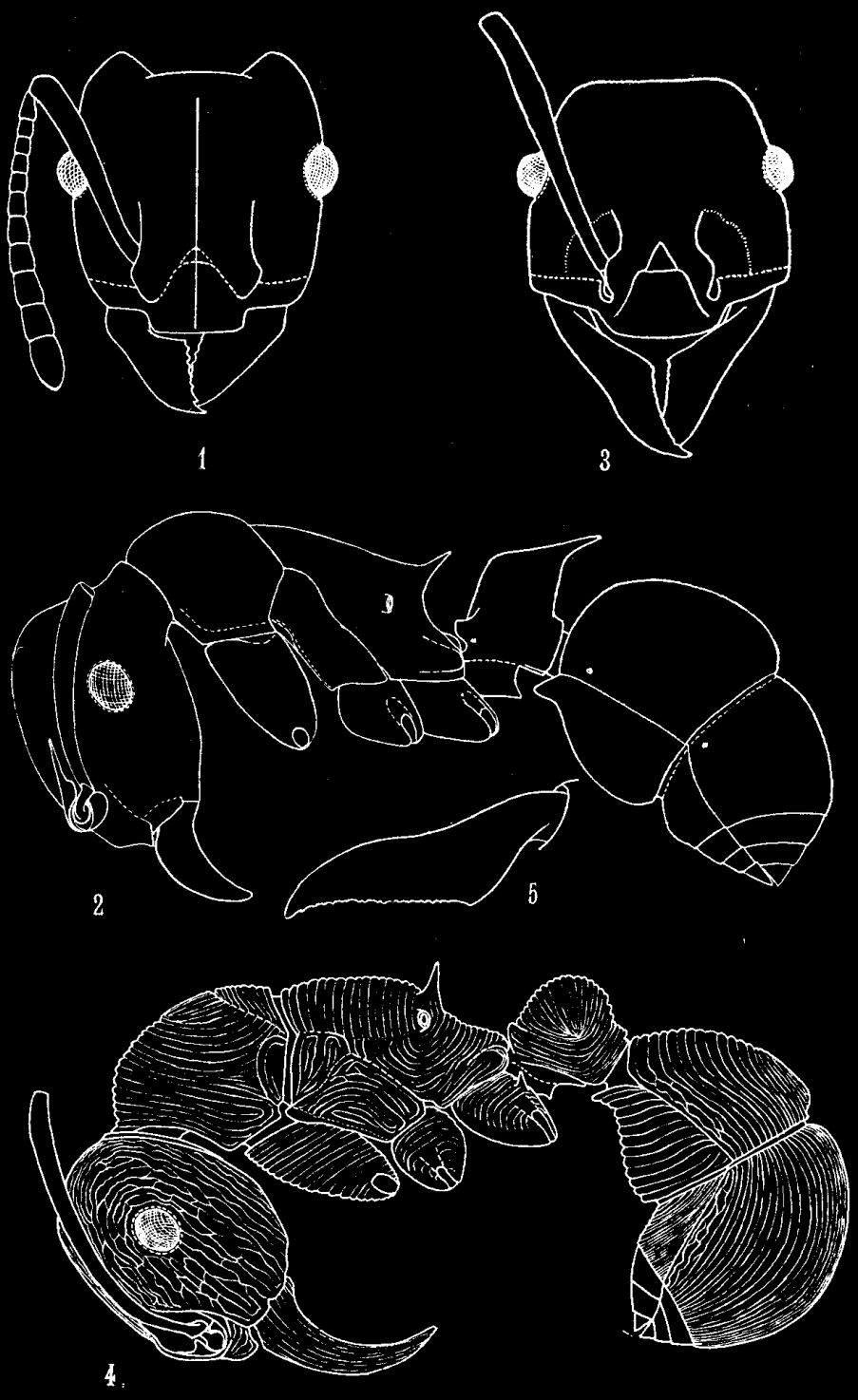
Variation. — No specimens were found in any of the three nests that showed outward signs of being a queen, ergatoid or otherwise. We assume that in this species, as in most *Rhytidoponera* and some other ectatommines, there is no obvious morphological differentiation of worker and queen castes, but that certain individual workers are fertilized and act as reproductives. The two nest series studied under the lens differ from each other in size and color. The first series, including the holotype, averages larger: head length 1.59-1.73 mm; head width 1.35-1.48 mm; truncus length 2.00-2.13 mm; hind femur length 1.59-1.68 mm; whereas the second series (C-21) has head length 1.40-1.46 mm; head width 1.21-1.30 mm; truncus length 1.64-1.81 mm; hind femur length 1.35-1.41 mm. This last series has the mandibles, antennae and legs a somewhat brighter ferruginous, contrasting with the black body. Immature workers of both series are dark reddish brown. Some individuals have the propodeal teeth very slightly recurved at their apices, while others have straight teeth. The petiolar spine also varies in that some examples have the apex straight, while others have it bent very slightly downwards. Sculptural and other variation is very slight.

Types. — 56 workers, as follows: Colombia, Valle Dept., Television Tower Road, Salidito, W of Cali, 1900-2100 m, March 23, 1967, R. B. Root and W. L. Brown, Jr. leg., 34 workers (holotype and paratypes), collected in rotten wood (no. C-25); same data, 2100 m, 22 workers (paratypes), collected in mossy log (no. C-21), deposited in MCZ, Cornell University collection and WWK. A third colony, later lost when the vial was broken, was taken near colony C-25 in a cavity of a small tree, under rhizomes of an epiphyte about 2.5 m above the ground.

Discussion. — General habitus of an *Acanthoponera*, but with reduced number of palpal segments (3,3), simple tarsal claws and obsolescent antennal scrobes, which characters place it into genus *Heteroponera*.

In Kempf's key (1962: 31-32) the present species runs to couplet 2. On account of its piceous color and relatively weakly sculptured terga I and II of gaster, *monticola* agrees more with the first alternative, *carinifrons* from Chile, but is really strikingly different from the latter species in general habitus, much larger size, protruding and marginate occipital lobes, strong propodeal teeth, strong reclinate spine on petiolar apex, heavily reticulate-foveolate dorsum and sides of head.

On account of the lobate occipital corners and well developed propodeal spines, *monticola* is closest to the nearly sympatric *inca* (the only other species having these characters), from which it disagrees in the following features: Body color black, much larger size, shorter and parallel frontal carinae, shorter and less distinct antennal scrobe, longer



Heteroponera monticola sp. n., worker: Fig. 1. Head in full-face view; Fig. 2. Body in side-view. — *Gnamptogenys perspicax* sp. n., worker: Fig. 3. Head in full-face view; Fig. 4. Body in side-view; Fig. 5. Mandible. — (Kempf *del.*)

funicular segments II-VII (longer than thick), more superficial and less distinct reticulate-rugose macrosculpture on thorax and gaster, strong petiolar spine like that of *Acanthoponera,* and longer propodeal teeth.

The nests as found contained from about 30 to about 45 adult workers each. From nest C-21, 5 workers were dissected, and all had 6 malpighian tubules. Of 8 workers dissected from nest C-25, 2 had 5 tubules, 3 had 6, and 3 had 7.

Gnamptogenys perspicax sp. n.

(Figs. 3-5)

Worker (holotype). — Total length 9.5 mm; maximum length of head capsule 2.00 mm; maximum width of head in front of eyes 1.95 mm; scape length 2.15 mm; maximum diameter of eyes 0.35 mm; maximum width between frontal lobes 0.78 mm; Weber's length of truncus 3.08 mm; hind femur length 2.67 mm; petiole length 0.82 mm; petiole width 0.77 mm; postpetiole (segment I of gaster) length 1.38 mm; postpetiole width 1.53 mm. Black; mandibles, antennae, legs except coxae reddish brown. Retractile apical gastric segments yellowish brown. Shining throughout in spite of sculpture. Body and appendages with abundant pale standing hairs which mostly equal or exceed in length the maximum diameter of eyes; those that fringe the anterior border of clypeus are longer. Pubescence scarce, practically invisible except on funiculi, flexor face of tibiae, tarsi and underside of petiole.

Head as shown in Figs. 3 and 4. Mandibles (Fig. 5) elongate-subtriangular; basal border much shorter than apical border; outer border sinuous; chewing border with approximately 15 small, triangular denticles, often worn down, except for the strong apical tooth; basal angle obtuse. Dorsum longitudinally costulate; costular count across greatest width 8-10. Palpi 3,2.

Head capsule nearly as broad as long, broader in front than behind; clypeus convex, with a modest median sulcus and a narrow, nearly straight-edged anterior apron that has its antero-lateral angles gently rounded; disc with 16 longitudinal costae. Frontal area impressed. Frontal lobes convex, short, not covering completely the antennal sockets when seen from above, obliquely raised laterad, strongly constricted behind. Frontal carinae very short, obliquely diverging caudad, fading out in front of eyes. Lateral borders of head gently convex, converging caudad. Occipital border practically straight; occipital corners broadly rounded. Eyes subglobose, protruding, with a circummarginal

sulcus, with about 20 facets across the greatest diameter. Front between carinae with about 12 longitudinal costae that tend to spread out fan-like posteriorly, where they become irregular and anastomose occasionally among each other, with deeper foveae between the costae or within the meshes. Sides of head rugose to reticulate-rugose. Occiput with 3-4 transverse costae above the foramen. Occipital flange narrow but conspicuous. Gula with longitudinal, irregular costae; costae of both sides converging in front and fusing with one another in a semicircular fashion.

Antennal scapes slender, longer than head capsule proper, greatly projecting beyond occiput; shining, finely striate. All funicular segments longer than broad, decreasing in length and increasing in thickness towards apex; apical segment twice as long as the subapical segment.

Truncus as shown in Fig. 4. Dorsal surface of pronotum transversely costate in front, longitudinally behind, the anterior transverse costae (12) curve caudad on sides, the mesial ones flanking the 5 postero-median longitudinal costae, the lateral ones continuing horizontally and more irregularly on sides of pronotum. Promesonotal suture distinctly impressed but not interrupting the sculpture pattern: the 6-7 transverse costae of mesonotum close the circle around the posteromedian costae of pronotal disc. Metanotal groove deeply impressed. Dorsum of propodeum transversely convex, transversely costate, about 16 costae in front of the strongly raised and pointed propodeal spines; the latter about half as long as their distance between their inner faces at base. Propodeal stigma round, slightly protruding. Mesepisternum with the usual narrow anterior flange, its surface irregularly costate-rugose. Rest of sides of truncus, except posteriorly where horizontal costae predominate, rather irregularly costate-rugose. Declivitous face of propodeum transversely costate. All costae slightly to conspicuously vermiculate, in the latter cases with frequent anastomoses. Piligerous pits usually conspicuous and impressed. Fore coxae regularly horizontally costate, as are the upper surfaces of the middle and hind coxae; the latter with a strong basidorsal spine. Legs long, slender, smooth and shining. Extensor face of tibiae finely longitudinally striate. Tarsal claws of all legs with a well-developed subapical tooth.

Petiole (Fig. 4) low, longer than broad (but the node proper slightly broader than long), transversely costate above, with about 18-20 costae across the dorsum, the anterior and posterior ones

becoming horizontal on sides, encircling the mesial ones. Subpetiolar process plate-like, with anterior and posterior corners rectangular and slightly pointed, the inferior border gently emarginate.

Gaster as shown in Fig. 4. Tergum I (postpetiole) with about 12-14 transverse vermiculate-costate ridges in front, the lateral continuations horizontal, enclosing a few (3-5) posteromedian longitudinal short costae that occupy the posterior third of the dorsal length of the segment. Sternum I transversely vermiculate-costate, anteroventral process entire. Tergum II with 45-50 longitudinal costae that are more regular; extreme lateral ones somewhat vermiculate; piligerous pits inconspicuous. Sternum II with finer rugae that converge mesally behind.

Worker variation. — 29 workers closely examined from the type nest series are nearly identical for all practical purposes, except for small details of sculptural pattern. The head varies from slightly longer than wide to slightly wider than long, but this depends somewhat on the exact viewing angle. The range of critical measurements for the type series is as follows: Total length 9.0-9.6 mm; head length 1.86-2.00 mm; head width 1.86-2.00 mm; scape length 2.15-2.26 mm; maximum diameter of eye 0.34-0.38 mm; Weber's length of truncus 2.90-3.13 mm; hind femur length 2.51-2.72 mm; petiole length 0.82-1.00 mm; length of petiolar node excluding anterior cornuae 0.64-0.81 mm; petiole width 0.72-0.82 mm; postpetiole length 1.33-1.44 mm; postpetiole width 1.48-1.60 mm. Two workers dissected each had 6 malpighian tubules.

Ergatoid queen. — Total length 8.6 mm; head length 1.67 mm; head width in front of eyes 1.60 mm; mandible length, straight line, outer base to apex, 1.40 mm; scape length 1.60 mm; maximum diameter of eye 0.28 mm; Weber's length of truncus 2.45 mm; hind femur length 2.00 mm; petiole length 0.80 mm; length of petiolar node (without anterior cornuae) 0.58 mm; width of petiolar node 0.88; postpetiolar length 1.24 mm; postpetiole width 1.90 mm.

Body overall smaller than in any of the workers of the same nest series, but gaster both relatively and absolutely broader and deeper, decidedly broader than the head. (In workers, head is broader than gaster). Truncus short and stocky; antennae and legs shorter than in worker, and eyes a little smaller; anterior ocellar pit well developed but without lens; other ocelli obsolete.

Head feebly convex behind in full-face view. Propodeum shorter, more convex above than in worker, and petiolar node both shorter and wider. Pilosity and sculpture much as in worker (hairs perhaps a bit longer and more abundant, costulae sometimes slightly more crowded); color piceous black; antennae, legs, mandibles and gastric apex ferruginous yellow.

This peculiar queen outwardly resembles mermithergate individuals of some other ponerine ants so closely that the gaster was dissected; it proved to contain no parasite, but only what appeared to be the dried remains of the usual ant abdominal organs.

Types. — 29 workers and one ergatoid queen from Colombia, Valle Dept., Pichindé Valley, SW of Cali, 1570 m, March 22, 1967, R. B. Root and W. L. Brown, Jr. leg. holotype and paratypes deposited in MCZ, Cornell University collection and WWK).

Discussion. — *G. perspicax* is close to *G. bispinosa* from Costa Rica, differing principally in the black color, longer mandibles, shorter and much broader head, narrower and less protruding occipital flange, much shorter and more strongly raised propodeal spines, more prominent and subglobose eyes. The differences from the *triangularis*-group (formerly subgenus *Parectatomma*) include larger size, much more irregular sculpture; long propodeal teeth; conspicuous (not obsolete) promesonotal suture; transversely sculptured mesonotum; strongly constricted frontal lobes; strikingly protruding eyes; very long antennal scapes. In fact, *G. perspicax* is a perfect intermediate between the *triangularis* group, particularly such species as *mecotyle* and *schubarti*, and the somewhat aberrant *G. bispinosa*. The new species also helps to close up the morphocline connecting the *triangularis* group and the *schmitti* group (formerly *Emeryella*). Had *Parectatomma* and *Emeryella* not already been synonymized with *Poneracantha* in the genus *Gnamptogenys*, the discovery of *G. perspicax* would surely have forced the change even in the most conservative classification.

G. perspicax is not easily accommodated in the key of Brown (1958: 230) to the New World species of *Gnamptogenys*. It might logically come out in couplet 1 with *bispinosa*, but the propodeal teeth are not quite long enough. If we go on, we come to couplet 6, where the rather distinct promesonotal suture of *perspicax* might lead us to the otherwise quite different *striatula* group (formerly *Holcoponera*), were it not that the suture fails to break the sculpture. Moving on, we end in the *triangularis* group, and *perspicax* keys out uneasily to *mecotyle* (and is also similar to *lanei* of Kempf 1960). The characters already listed above will readily separate *perspicax* from these and other members of the *triangularis* group.

Biology. — The type nest of *G. perspicax* was taken in a heavily shaded ravine in cloud forest about 50 m off the road into Pichindé Valley, southwest of Cali and at an elevation of about 1570 m. The nest was in a large rotten log lying on the ground, but with one large

branch raised off the ground about 1.5 m; the nest was in the end of the branch, and consisted of 4-5 chambers of different sizes (all more than 2 cc volume) and a very large nest entrance at the open free stub-end of the branch, more than 4 cm in diameter. The lip of the nest opening and the ground beneath was strewn with the bleached remains of large millipeds, and freshly cut-up milliped prey specimens were found within, being fed upon by the ant larvae. No other kinds of prey could be found in or around the nest. Most of the nest, with its ergatoid queen and some larvae, were brought to the United States for observation, and subsequent tests showed that live-caught millipeds are far and away the preferred food of *G. perspicax*, and probably its only food in natural circumstances. The ant is resistant to the defensive cyanide released by some millipeds, particularly polydesmoids. This resistance, and the utilization of millipeds for food by *perspicax* and related species of *Gnamptogenys*, will be discussed in another paper. The nest as found contained about 45 adult workers and the single queen.

References

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